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修士論文要旨

Association between Altitude of Residential Area and Age adjusted Cancer Mortality Rate in Japan

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[**Introduction**]

In recent years, several epidemiological studies have reported associations between altitude of residential area and health of resident. However, research on the association between altitude and cancer is scarce. Cancer is the most common cause of death since 1981 in Japan. Approaching factors that affect outbreak of cancer from various aspects is important and urgent subject. In this study, we elucidate association between altitude and cancer mortality rate in Japan at prefecture level using administrative data.

[**Materials and Methods**]

First, correlation analysis was performed to evaluate the association between altitude and cancer mortality at prefecture level. Data of altitude was “mean altitude of residential area” calculated by Statistical Information Institute for Consulting and Analysis. In addition, data of cancer mortality was “age-adjusted cancer-related mortality for under age 75 (2012)” obtained from the cancer information service of the National Cancer Center. Thereafter, multiple regression analyses were conducted. The cancer mortality rates which were recognized significant associations with the altitude in the correlation analysis were used as the response variables. The following variables were used as confounding factors; smoking rate, salt intake, ratio of people having drinking habits, mean body mass index, cancer screening rate, prefectural income per person, ratio of people having completed up to colleges and universities, participation rate of volunteer activities. All analysis was separated by sex. A P value of <0.05 was considered statistically significant, and SPSS Statistics Version 22 was used for the analysis.

[**Results and Discussion**]

Results of the multiple regression analyses showed significant negative associations between altitude and mortality rate of stomach and lung cancer in males even after adjusting for the confounding factors. (Table 1,2)

Table 1 Result of the multiple regression analysis with age-adjusted mortality of LUNG CANCER in MALES as a response variable

Variable	β	P
Smoking Rate	0.481	< 0.000
Mean Altitude of Residential Area	-0.361	0.006
Cancer Screening Rate	-0.291	0.035

R=0.627, Standardized R^2=0.351

Table 2 Result of the multiple regression analysis with age-adjusted mortality of STOMACH CANCER in MALES as a response variable

Variable	β	P
Salt Intake	0.549	< 0.000
Mean Altitude of Residential Area	-0.526	< 0.000

R=0.582, Standardized R^2=0.308

β: Standardized Regression Coefficient, P: P-Value

R: Correlation Coefficient, R^2: Cofficient of Determination

A significant negative association between altitude and lung cancer is consistent with the study by Simeonov et al (2015). They suggested that hypoxia environment has a possibility to decrease the risk of lung cancer caused by the oxidizing DNA damage. Result of the present study indicated a possibility that difference of the oxygen density affects outbreak of lung cancer in areas with relatively small difference of altitude. Another notable point is standardized regression coefficient of altitude was close to that of salt intake in the multiple regression analysis with stomach cancer mortality rate in males as a responsible variable. The negative association, which was recognized after adjusting for confounding factors, presented a possibility that not only lifestyle but also altitude affect outbreak of stomach cancer. This study is an ecological study. Therefore, further epidemiological study matching personal data is required.